FARMLINE

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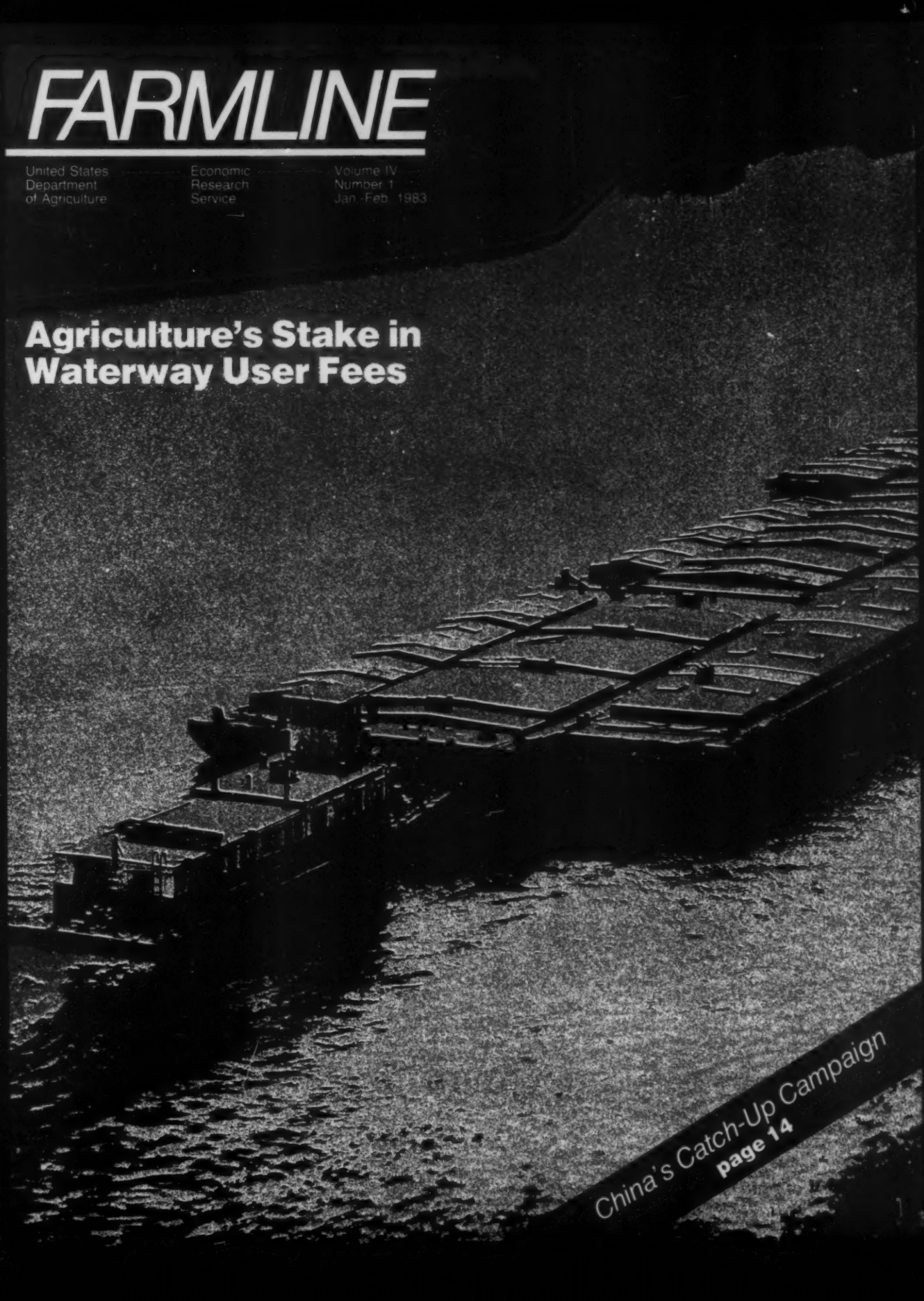
Agriculture's Stake in Waterway User Fees



China's Catch-Up Campaign page 14

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PERSPECTIVES

THE PAYMENT-IN-KIND (PIK) PROGRAM seems to have struck a responsive chord among hard-pressed farmers. Under the program, USDA will use grain, cotton, and rice stocks to provide farmers with a specified percentage of their normal crop yield if they sign up for additional acreage reductions. Analysts expect high participation rates--the first essential for PIK's success. Beyond that, PIK will be judged by its impact on U.S. harvests, stock levels, and ultimately farm prices.

Assessments at this time are speculative because so little can be known about weather, world crops, economic conditions, and all the other pieces of the puzzle. Even PIK participation remains a questionmark until after March 11 when signup ends. Nevertheless, USDA analysts have already gone through the first round of preliminary assessments, and their reviews are worth considering.

They caution that PIK doesn't spell instant relief, but it does have a strong selling point. "PIK is designed to turn the 1983/84 crop season into a transition year," says economist Keith Collins. "All our projections suggest that it wouldn't be a transition year without PIK. PIK is expected to lower our stocks and help set the stage for higher farm prices one or two years from now."

Just consider the alternative, he adds. "We'll finish this season with record stocks, and without PIK our grain and cotton stocks would almost surely go even higher by the end of the 1983/84 season. Also, we'd be looking at another $10-$15 billion in CCC expenditures for farm programs. It would be like throwing money into a bottomless well without any hope of drawing water." So, what will PIK do besides promoting conservation and reducing farm program costs? Here's how USDA analysts measured potential impacts in late January.

Impact on acreage and production: PIK is expected to take out of production about 11% of the combined base acreages of corn, grain sorghum, wheat, cotton, and rice. Thus, because of PIK, roughly 23 million fewer acres than last year may be harvested to 1983 crops. When both PIK and the other acreage reduction programs are considered, harvested area could drop 30 million acres from 1982. The result: From PIK alone, combined 1983 wheat, corn, and grain sorghum production may be reduced by over 1 billion bushels (10%) from 1982; cotton output reduced 2.5 million bales (20%); and rice reduced 21 million cwt (15%).

Impact on stocks: Total stocks of wheat, corn, and grain sorghum at the end of the 1983/84 season should be reduced by more than a billion bushels from levels expected before PIK and around 600 million bushels from 1982/83 levels. Upland cotton stocks may be reduced by 2 million bales from 1982/83 levels, and rice stocks by about 11 million cwt. Before PIK was announced, analysts had expected 1983/84 ending stocks to rise for all five program crops.

Impact on farm prices: Only limited price impacts are likely during the 1983/84 crop year because stocks will remain large. But note: Markets also respond to changes in stock levels, so prices could firm as stocks decline. Besides prices, net returns may get a boost. If a farmer receives 80% or 95% of his normal crop yield without planting, he saves on production costs. The savings should more than offset the yield difference, providing steady to higher net returns. "Farm spending on inputs may decline by about $1.2 billion or 3.5% this year because of PIK," says economist Ron Meekhof. That should mean some improvement in cash flow, somewhat less borrowing, and maybe even some repayment of farm debts.

But what happens to the inputs industries? No doubt PIK will add to already depressed conditions. Pesticide and seed use may each decline 8%-12% this year instead of 3%-5% expected without the PIK program. Fertilizer use may fall 7%-12% from 1982 levels instead of the previously expected 3%-5%. Machinery purchases may decline less than 1%--they're linked more to net returns than a single year's plantings. It's not good news, says Collins, "but we have to keep in mind what would happen to future sales of inputs if we didn't take steps now to reduce our huge stocks."

FARMLINE

AGRICULTURE . . . NATURAL RESOURCES . . . RURAL DEVELOPMENT
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FEATURES

Agriculture's Stake in Waterway User Fees *by Patricia F. Singer* 4

It's a new Congress, but the same hard questions remain about waterway user fees. Would all costs be shifted to users? How would fees be assessed and collected? How would the transportation system be affected? And would the fees be passed back to farmers who depend on waterways to get their products to ocean ports? Agriculture's stake in the debate may depend on the answers.

Unscrambling the Hired Farmworker Stereotype *by Susan Pollack* 8

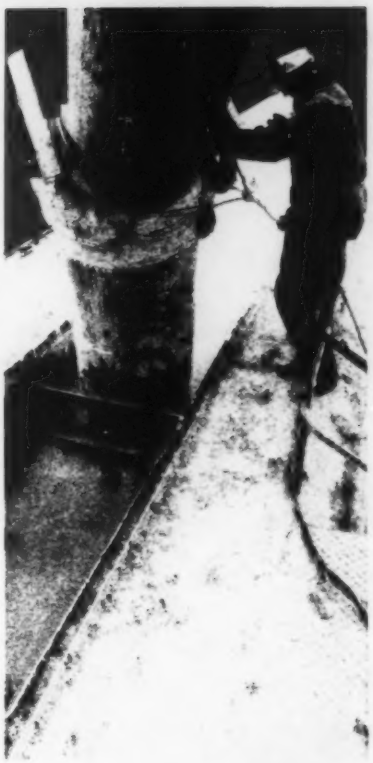
Hired farmworkers are often stereotyped as poor, minority group migrants. The majority are neither migrants nor members of minority groups, but the average incomes of farmworkers and their families are well below the U.S. average. Economist Susan Pollack unscrambles the variations in farmworker earnings and considers how these variations reflect on the economic status of different groups of farmworkers.

Pesticide Industry Faces a Changing Farm Scene *by Bill Serletis and Michael Hanthorn* 12

The pesticide industry has put in a relatively stable performance despite the current demand slump. Though slow growth in demand is expected to resume when the farm economy recovers, the industry still faces further adjustments to new farm production practices. Economists Serletis and Hanthorn discuss the pesticide demand outlook and review farm spending and use patterns for corn, wheat, soybeans, peanuts, and cotton.

Catch-Up Campaign for China's Agriculture *by Sherrie Meyer* 14

China's farm sector has made considerable progress over the last few years. Production specialization, government incentives, a production responsibility system, and the expansion of private plots are all part of a campaign to catch up from the setbacks of the Cultural Revolution. Can China sustain the momentum? Economists Frederic Surls and Fred Crook take a close look at China's recent gains and its agricultural potential.



DEPARTMENTS

Agricultural Roundup: Computer Access to ERS Reports; Rural Poverty Profile 17

Reports in the News: Peanut Industry; America's Menu 18

Farmline Trends: The Energy-Rich States 19

SPECIAL IN THIS ISSUE

1983 Calendar of Reports 10

This special centerfold is your January-June 1983 calendar of situation and outlook reports of the Economic Research Service, crop and livestock reports of the Crop Reporting Board, and supply and demand estimates of the World Agricultural Outlook Board. Tear out and save this handy guide to release dates and ordering information.

Agriculture's Stake in Waterway User Fees

It's a new Congress, but the same hard questions remain about waterway user fees. Legislators are likely to face these questions again this session when, and if, debate resumes on proposals to shift the cost of running America's inland waterways to users.

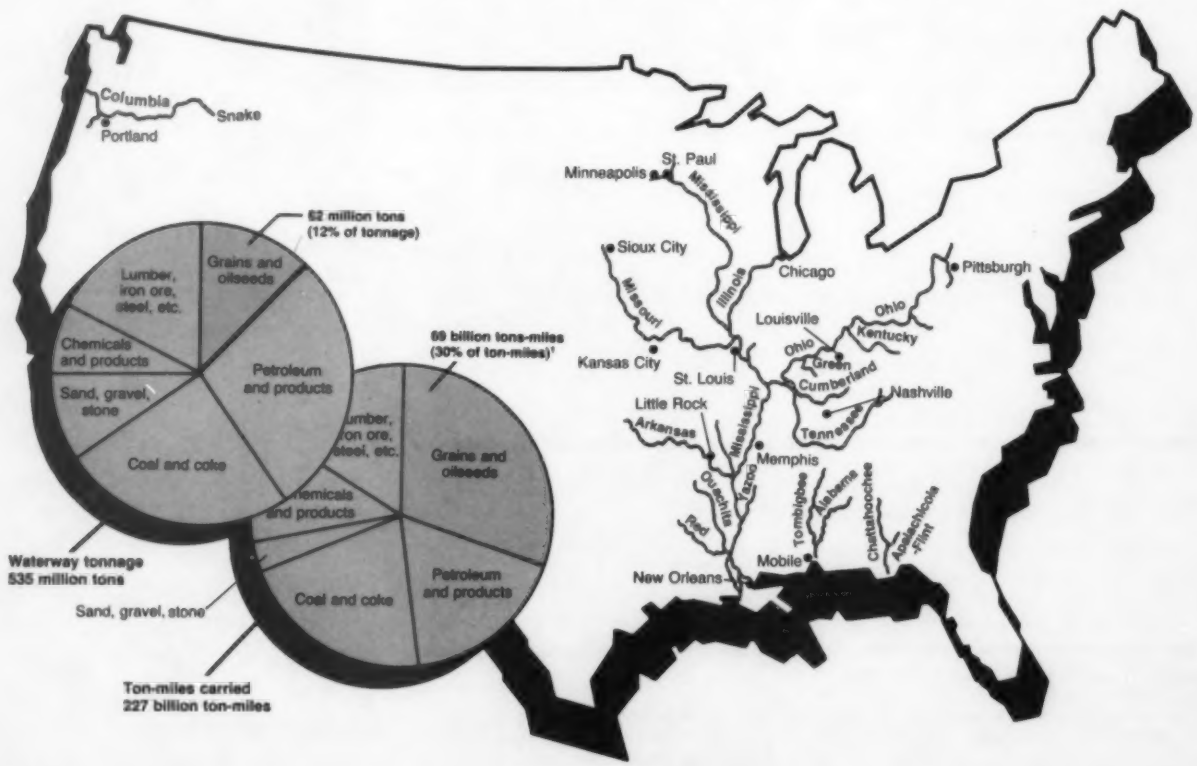
Among the interested parties are those who may have to bear the cost—barge operators, importers, and shippers, including farmers who depend on the waterways to get their grains and oilseeds to ocean ports.

This cost is substantial. Including operation and maintenance plus construction already authorized, the government's annual tab for commercial navigation is well over $200 million. That works out to around a tenth of a cent per ton per mile for products carried on inland waterways.

The United States exported 50 million metric tons of corn, 45 million of wheat, and 25 million of soybeans in fiscal 1982. According to transportation economist Bill Gallimore of USDA's Economic Research Service, close to half these exports traveled to ocean ports in barges via the U.S. inland waterway system.

In 1977, the most recent year for which an extensive grain flow survey was done, 61 percent of soybean exports, 50 percent of corn exports, and 29 percent of wheat exports moved through inland waterways. Distances range as high as 1,700 miles for grain traveling from upper Midwest terminals to Gulf of Mexico ports.

Selected Inland Waterways and Principal Commodities Carried in Domestic Internal Waterborne Commerce



[1]Based on average grain haule. Although grains and oilseeds accounted for only about 12% of tonnage, longer hauls gave them a 30% share of ton-miles carried.

All figures on tonnage and ton-miles (tons × miles carried) are based on 1980 domestic internal waterway traffic; data exclude lake and coastal waterborne commerce.

Many questions remain on how a user fee law would affect American farmers.

Until recently, the operation and maintenance (O&M) costs of the country's vast inland waterway system were shouldered almost entirely by the federal government. Then, in 1979, Congress imposed a tax on towboat fuel, partly to fund rebuilding of Mississippi Locks and Dam 26. Beginning in 1980 at 4 cents a gallon, the tax is set to increase gradually to a peak of 10 cents a gallon in 1985. But, even at that level, it will recover only 20 to 25 percent of the projected O&M costs for the entire system.

In 1981, the Administration proposed that all O&M costs attributable to commercial navigation be recovered from commercial users. Administration representatives say user fees are the fairest way to fund needed maintenance on the waterway system, and that full cost recovery would result in more efficient waterway use and development, as well as lower federal outlays.

Proponents of full recovery also say it would end what is, in effect, a government subsidy to commercial users of the waterway system. Heavy users include shippers of coal, iron and steel, petroleum, fertilizers, and grains and oilseeds. In the case of grains, oilseeds, and other products shipped abroad, government funding of U.S. waterways can also be viewed as a subsidy to foreign buyers.

For American farmers, the impact of a user fee law would depend not only on whether it required full cost recovery but also on the mechanics of assessing and collecting the fees. Would the fees be assessed uniformly across the whole water system or segment by segment according to the rivers used? And how would they be collected?

Other questions also loom. How would the transportation system be affected? Who ultimately would pay the fees—the

Courtesy of The American Waterways Operators, Inc.

farmer, the barge operator, or the importer? And would the fees affect some farm regions more than others? Most of the answers are incomplete, and many remain the subject of debate.

Segment Versus System-Based Fees

The rivers that make up the inland waterway system are far from uniform in traffic volume or operating costs. The differences were measured in a study performed for the U.S. Department of Transportation.

The study concluded that the Ohio, Mississippi, and Green rivers have the lowest costs per unit of traffic. The Apalachicola/Flint, Kentucky, Ouachita/Red, and Arkansas rivers have the highest costs per unit of traffic. Other segments of the system fall somewhere in between.

For example, according to the study, a charge of 0.074 cent per ton per mile would be required on commercial cargo to recover full 1977 O&M costs on the Ohio River. By contrast, full recovery on the Apalachicola/Flint segment would require 5.8 cents per ton-mile—78 times as much.

Clearly, if user fees were collected on a segment-specific basis, transporting goods would be vastly more expensive on some waterways than on others.

The difference would tend to grow greater, too, as shippers on the high-cost segments diverted their cargo to rail or truck to avoid waterway user fees. Since total O&M costs are relatively constant regardless of traffic volume, fees would then grow even higher as commercial traffic declined on the high-cost segments. In fact, according to Gallimore, "Some of the segments theoretically would be threatened with closing under segment-specific fees."

But, as Gallimore and others point out, there are also some inequities in a systemwide fee.

The average cost per ton-mile over the entire system is 0.14 cent. Because some segments cost considerably less than others to operate and maintain, a systemwide fee would force users of the lower cost rivers to help pay for O&M on the higher cost rivers. Most waterborne grain and soybeans, says Gallimore, travel on low-cost or medium-cost segments: the Mississippi, Illinois, Ohio, Missouri, and Columbia/Snake. The one exception is the Arkansas, a high-cost segment that carries both soybeans and wheat.

Which Collection Plan?

Besides the choice of systemwide or segment-specific fees, there is another question that has implications for agriculture. That is, how would the taxes be collected? On towboat fuel, as now? According to tonnage and mileage of cargo transported? By licensing barges?

A systemwide fuel tax would basically parallel the gasoline tax that supports the U.S. interstate highway system. It may also be the best collection scheme for farm interests, according to the Department of Transportation study.

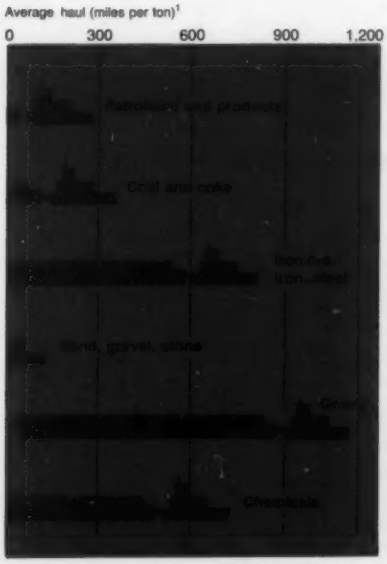
The reason: Grains tend to move in long tows, while petroleum and chemicals have to travel in relatively short tows because of the danger of a spill. And, grain barges can be loaded more heavily than those carrying iron and steel; the latter have uneven loading characteris-

tics that do not permit a full load. Thus, grain barge tows are more fuel efficient, and a fuel tax would reflect this advantage.

Some other fee collection options are less favorable to agriculture. A tax on cargo per ton-mile, according to transportation specialist John Gerald, would be "direct and visible and thus much more likely to show up on shippers' bills as specific, separate charges" than a fuel tax. Consequently a ton-mile tax would be easier to pass back to the farmer.

Also, barges that move grain downriver sometimes carry fertilizer back to farm areas upriver. Both commodities usually move long distances, whereas hauls of coal, sand and gravel, and iron tend to be short. A ton-mile collection scheme would, to some extent, penalize the grain and fertilizer hauls because of their length.

Grains Travel Longer Distances on Inland Waterways



[1]For domestic internal traffic on inland waterways, 1980; excludes lake and coastal waterborne commerce.

Another suggested collection scheme is licensing of barges. For farmers, this would have the advantage of integrating the user fee into the barge operator's overhead, making the fee less likely to be passed directly back to the producer. But barge licensing might tend to reduce the number of barges available at any one time, diminishing the barge fleet's capacity to handle sudden swells in grain sales, particularly at harvesttime.

Under the various collection schemes, how much would the fees run per bushel of grain or soybeans? The Congressional Budget Office estimated that one bill proposed by the Administration during the last Congress (but not passed) would add 6 cents per bushel by 1990. That bill (amendment 637 to S. 810) specified systemwide fees to recover full O&M costs and segment-specific fees to recover capital costs of any new construction. It left the fee-collection mechanism up to the Secretary of the Army who, through the U.S. Army Corps of Engineers, is responsible for the waterways. Researchers at the Congressional Budget Office calculated the 6-cent-a-bushel average cost from a cargo tax of 0.16 cent per ton-mile.

Another Factor: Rail Response

Besides the systemwide versus segment-specific question and differences triggered by various collection mechanisms, user fees would also reflect another variable—the reaction of the railroads to higher barge rates.

Railroads might respond by not raising their rates at all, and thus win business from shippers in swing areas that have a choice of either rail or water transport. Or they might raise their rates somewhat, but not as much as user fees would add to barge rates. Or they might respond by increasing rail rates to match a new waterway user fee.

Paradoxically, of the three possibilities, waterway fees would be the highest if railways did not increase their rates at all. This is because more grain would be diverted to rail, and total waterway O&M costs would have to be recovered from fewer users. On the other hand, if railways in the swing regions raised their rates the full amount of the waterway fee, the relative shares of grain traffic carried by rail and barge would probably remain about the same as before waterway fees were imposed.

Some farm marketing groups and waterway interest representatives have testified in congressional hearings that they fear waterway user fees would result in a return to rail monopoly power in some areas. Current rail laws (the 4-R Act of 1976 and the Staggers Rail Act of 1980), they say, might allow railroads to make windfall profits if larger waterway fees are imposed. They also point out that the railroads have received numerous breaks, such as mineral rights on government grant railroad land and substantial rail-track tax writeoffs in the Economic Recovery Tax Act of 1981.

Railway representatives counter by pointing out that federal subsidies for waterways have for decades allowed barge lines to charge rates below the real cost of service.

For farmers, perhaps the most sensitive question raised by waterway user fees is who would ultimately pay them. Will they be passed on to importers, or passed back to producers? Pat Singer examines this question—and the conflicting answers—next month. She also points to findings that some states will be affected far more than others. Watch for the second half of her report in the March *FARMLINE*. □

[Based on material provided by ERS economists Bill Gallimore and Mike Harris of the National Economics Division and Jerry Sharples of the International Economics Division, and on additional information from Charles Pearson and John Gerald (recently retired) of the USDA Office of Transportation.]

Unscrambling the Hired Farmworker Stereotype

Hired farmworkers are often stereotyped as poor, minority-group migrants. Although some certainly fit this image, the typical farmworker is more likely to be white, a nonmigrant, and part of a family with an annual income of $10,000 or more.

Only 8 percent of the 1979 hired farm workforce consisted of migrants—and family incomes of migrant workers actually were higher than those of nonmigrant farmworkers. As for ethnic and racial characteristics, only 25 percent of all farmworkers were black or Hispanic.

Parts of the stereotype are close to truth. In 1979, average annual earnings for a farmworker were $4,185, compared with $11,435 for all U.S. private sector production workers. At least some of the difference may be explained by the relatively large proportion of students, housewives, and other part-time wage-earners in the farmworker population. However, family incomes (the combined income sources of all family members) also reflect this low-income status.

In 1979, the median family income of farmworkers was $13,384, only 68 percent of the U.S. median family income of $19,587.

The family incomes of hired farmworkers varied significantly according to racial and ethnic, occupational, and household characteristics. For example, whites, household heads, and students who did farmwork to supplement other income sources had somewhat higher family incomes than others.

The hired farm workforce includes both those who depend on farmwork earnings for a substantial part of their total income and those who do farmwork to supplement other income. In other words, a "hired farmworker" could be a college student who picks tomatoes only a few days a year for pay.

In fact, farm jobs were the primary source of income for less than a third of the hired farm workforce. Others, who used farm earnings to supplement other income sources, also did nonfarm work, attended school, or kept house most of the year. About 36 percent of the farm working force consisted of students, and another 18 percent did nonfarm work most of the year.

Farm jobs were the primary source of income for less than a third of the farm workforce.

Students' Family Income Is Higher

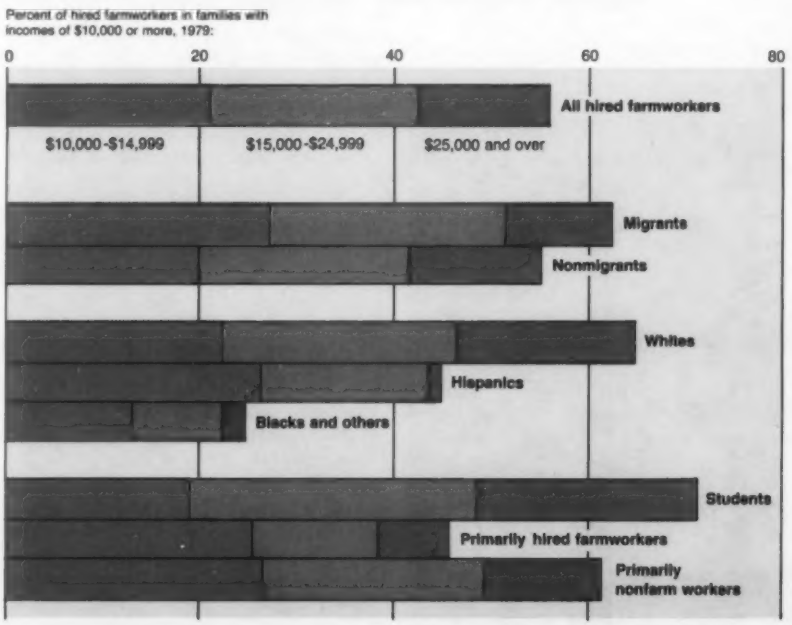
The farmworker students and others who labored primarily at nonfarm jobs were generally in families with higher incomes. More than half the students and more than a third of those receiving most of their earnings from nonfarm jobs came from families with incomes of at least $15,000 annually.

In contrast, those whose major source of earnings came from farmwork had much lower family incomes. Only 20 percent of them were from families receiving at least $15,000 annually.

On an individual basis, the earnings picture is somewhat different. Average annual earnings for students were $1,434. For farmworkers who mostly did nonfarm work, average earnings were $8,348, with 14 percent coming from farmwork. Those whose primary labor force activity was farmwork averaged $6,089 a year, with about 96 percent of it coming from farm wages.

Family income and individual earnings also varied according to the racial or ethnic backgrounds of farmworkers. In

Family Incomes of Hired Farmworkers Show Significant Variations



Source: The Hired Farm Working Force Survey, 1979, conducted by the Bureau of the Census for USDA's Economic Research Service.

1979, the hired farm workforce was 75 percent white, 12 percent Hispanic, and 13 percent black and other.

White farmworkers came from families with the highest incomes; 64 percent had family incomes of at least $10,000 a year. Of farmworker families categorized as black or other, only 24 percent had family incomes of $10,000 or more. Among Hispanic farmworkers, 44 percent had family incomes of at least $10,000.

Individually, the average annual earnings from all sources for white farmworkers in 1979 was $4,262; for Hispanics it was $4,882; and for blacks and others it was $3,129. Since the overall family incomes of minority workers were relatively low, the data suggest that the families of these farmworkers are more dependent on earnings from farmwork.

Migrant Status

The stereotype of low-income, migrant farmworker families is not supported by the income data. Roughly the same percentage of migrant families—62 percent—had annual incomes of $10,000 or more as nonmigrant farmworker families. Nearly one-third of both migrant and nonmigrant families had annual incomes of $15,000 or more.

Migrants—defined as those who travel across state or county lines and stay overnight to do farmwork—comprised about 8 percent of the hired farm workforce in 1979. They averaged $4,852 a year in individual earnings from all sources, compared with $4,126 a year for nonmigrant workers. About 47 percent of migrant workers' pay came from farm earnings, compared with 60 percent for nonmigrant workers.

Still another area related to income level is family characteristics. The family structure, household status of family members, and the size of the family are all associated with overall family income.

When the farmworker in the family is a student or other relative of the head of the household, farm earnings are probably used to supplement family income. But when the head of household is a farmworker, the family is more likely to depend on farm earnings for a large portion of family income.

Roughly the same percentage of migrant families had annual incomes of $10,000 or more as nonmigrant families.

About four of ten farmworkers were household heads. They earned an average of $6,563, with about half coming from farmwork. Almost half of their families had total incomes of $6,000 to $14,999, and a quarter had incomes of less than $6,000 in 1979.

About ten percent of all farmworkers were spouses of household heads. More than half came from families with incomes between $6,000 and $14,999, and a quarter came from families with incomes of $15,000 or more per year. The farm earnings of spouses generally made only a minimal contribution to family income.

When the farmworker was the son, daughter, or other relative of the household head, family incomes tended to be higher. More than half of this group had family incomes of $15,000 or more, and almost a quarter came from families with incomes of at least $25,000. The low average earnings of students ($1,434) probably accounted for only a small proportion of family income.

Family Size and Income

The role of student farm earnings is also evident in still another factor related to family income: family size. Farmworkers with larger families tended to have higher incomes, at least partly because the farmworker tended to be a young member of the household—likely a student. Thus, the farmworker's farm earnings usually amounted to only a small part of total family income.

Of the farmworker families with at least five members, almost half had incomes of $15,000, compared with only 6 percent of one-person families and 18 percent of two-person families.

Total family income was also higher for farmworkers who worked fewer days on the farm. A third of all farmworkers spent fewer than 25 days at farmwork and earned an average of $2,825 annually from farm and nonfarm wages. About 13 percent worked 150 to 249 days on the farm, earning an average of $6,319. The 16 percent that spent 250 or more days at farmwork averaged $8,020 in total earnings.

However, 40 percent of those spending fewer than 25 days at farmwork came from families with incomes of at least $15,000, compared with a fourth of those working 150 to 249 days, and 30 percent of those working 250 or more days on the farm. The high family income for individuals working less than 25 days at farmwork reflects the high portion—better than half—of students among farmworkers in this category.

Farmworker earnings are an important indicator of the economic status of farmworkers, but other factors—such as total family income—must also be taken into account. Similarly, average individual earnings from farmwork may not accurately reflect the economic status of farmworkers whose farm wages merely supplement nonfarm income sources.

On the other hand, statistics on average farmworker family earnings may be distorted upwards by the much higher nonfarm incomes of families of students and other casual farmworkers. Thus, these figures may overstate the economic status of families that depend mostly on earnings from farmwork. □

[*Written by Susan Pollack, an economist with the Economic Development Division, Economic Research Service.*]

1983 Reports Calendar January-June

JANUARY

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
3 Dry Milk & Whey	4 Celery Poultry Slaughter	5	6	7 Vegetables
10 Turkeys	11 Crop Production	12 Noncitrus Fruits & Nuts Annual	13 Crop Production Annual Potato Stocks	14 World Agricultural Supply & Demand
17 Milk Production	18 Cattle on Feed	19	20 Cold Storage Catfish	21 Grain Stocks Rice Stocks
24 World Agricultural Supply & Demand Livestock Slaughter Eggs, Chickens, & Turkeys	25 Crop Values	26 Sheep & Goats	27	28 Vegetables Cattle Layers & Egg Production Annual
31 Egg Products Agricultural Prices				

FEBRUARY

MONDAY	TUESDAY	WEDNESDAY
	1 Wheat Poultry Slaughter	2 Agricultural Outlook
7	8 Livestock & Poultry	9
14 Potato Stocks Cattle on Feed	15 Agricultural Exports Sugar Market Statistics Milk Production	16
21	22 Cold Storage	23 Eggs, Chickens, & Turkeys Catfish
28 Agricultural Prices		

APRIL

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
				1 Meat Animals Production, Disposition, & Income Poultry Slaughter Dairy Products
4	5 Celery	6	7	8 Vegetables Poultry Production, Disposition, & Income
11 Crop Production	12 World Agricultural Supply & Demand	13	14 Potato Stocks	15 Milk Production
18 Cattle on Feed	19	20 Catfish	21 Grain Stocks Rice Stocks	22 World Agricultural Supply & Demand Livestock Slaughter Cold Storage Eggs, Chickens, & Turkeys
25	26 Fats & Oils	27	28	29 Vegetables Agricultural Prices

MAY

MONDAY	TUESDAY	WEDNESDAY
2 Egg Products	3 Livestock & Poultry Poultry Slaughter	4 Agricultural Outlook
9 Feed	10 Crop Production	11 World Agricultural Supply & Demand
16 Sugar Market Statistics	17 Agricultural Exports	18
23 World Agriculture Eggs, Chickens, & Turkeys	24	25 Cotton & Wool Milk Production, Disposition, & Income
30	31 Egg Products Agricultural Prices	

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Titles of reports issued by the Crop Reporting Board of the Statistical Reporting Service are printed in black. Complete reports are released—most at 3 p.m.—on the dates shown. To request subscription information, write: Crop Reporting Board, Room 5829 South Bldg., USDA, Washington, D.C. 20250.

MARCH

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	1	2 Agricultural Outlook	3 Egg Products Poultry Slaughter	4 Sugar & Sweeteners Celery Vegetables Dairy Products
7 Cotton & Wool	8 Fruit	9 Tobacco	10 Crop Production	11 World Agricultural Supply & Demand Peanut Stocks & Processing
14 Potato Stocks Cattle on Feed Hatchery Production Annual	15 Livestock Slaughter Annual Milk Production	16	17 Dairy Hop Stocks	18 Catfish
21 Hogs & Pigs	22 Vegetables Cold Storage Annual	23 Rice Eggs, Chickens, & Turkeys	24 Livestock Slaughter	25 Wool & Mohair
28	29	30	31 Agricultural Outlook Egg Products Agricultural Prices	

JUNE

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
		1 Agricultural Outlook Poultry Slaughter	2 Minn.-Wisc. Mlg. Milk Final 1980-82	3 Sugar & Sweeteners Dairy Products
6 Tobacco Celery Vegetables Annual	7 Vegetables	8	9	10 Crop Production
13 World Agricultural Supply & Demand	14 Milk Production	15 Cattle on Feed	16 Dairy	17
20 Catfish	21 Vegetables Cold Storage	22 Grain Stocks Hogs & Pigs Cherries	23 World Agricultural Supply & Demand Eggs, Chickens, & Turkeys Livestock Slaughter	24 Farm Production Expenditures
27	28	29 Acreage	30 Agricultural Outlook Agricultural Prices Monthly Agricultural Prices Annual	

Pesticide Industry Faces a Changing Farm Scene

Although pesticide use in U.S. agriculture has leveled off since 1980, the pesticide industry did not suffer the sharp drop in 1982 sales experienced by manufacturers of machinery, fertilizer, and some other agricultural inputs.

Overall, pesticide unit sales dipped only 2 to 5 percent from 1981 to 1982, while unit sales of farm machinery plunged 30 percent and fertilizer sales dropped 11 percent.

The modest dip in pesticide use came as some farmers tried to trim operating costs by cutting down on pesticide applications. Also, more farmers adopted integrated pest management (IPM) programs, which can reduce dependence on chemicals. Finally, demand is no longer being fueled by a steady expansion in the cropland base treated with pesticides. Today, herbicides are used on nearly all U.S. corn, cotton, and soybean acreage.

Despite the slow year, gross 1982 revenues of the pesticide industry changed little from the previous year. The slight decline in sales was offset by a 4-percent rise in pesticide prices.

The pesticide industry's relatively stable performance is largely attributed to farmers' reluctance to risk increased crop losses. Even so, some farmers accepted that risk and reduced the proportion of planted acres treated with pesticides or made fewer applications.

For example, corn soil insecticide sales fell about 20 percent in the Midwest. However, midwestern herbicide sales in 1982 declined only 1 to 2 percent from a year earlier as most farmers followed normal weed control practices, deciding that herbicide use was cheaper than increased cultivations.

Future Pesticide Use

Despite a recent drop in pesticide sales, the long-term outlook for pesticide use is somewhat more promising.

Minimum-till practices have increased over the past decade. In 1980, the major no-till crops were corn and soybeans, each with about 2 million acres—less than 3 percent of the planted acreage of each crop. Reduced-till practices were used on another 26 million acres of corn and 13.5 million acres of soybeans.

The pesticide industry may find stronger new markets in developing nations.

Minimum-till strategies may change the mix of herbicides applied because farmers will depend upon herbicides to control weeds before and after crop emergence. Future opportunities in the herbicide market will result from demand for products to meet specific needs, such as postemergent herbicides.

Insecticide and fungicide use may also increase on minimum-till acreage because plant residue, which would be covered with soil in a conventional tillage system, harbors insects and provides an environment for disease development. IPM programs, on the other hand, may cut pesticide use by encouraging farmers to improve application techniques and timing, and by using nonchemical pest control practices.

Overall, U.S. pesticide demand is expected to increase at an annual rate of no more than 1 or 2 percent in the 1980's. Slow growth in demand is also expected in other developed countries. But the pesticide industry may find stronger new markets in developing nations, where use is projected to increase 3 to 5 percent annually as these countries try to increase agricultural self-sufficiency.

U.S. pesticide use varies substantially among crops and across growing regions. In 1981, wheat farmers spent an average of $2.25 per acre on pesticides, while peanut growers spent $79 per acre. Differences in use patterns reflect environmental factors, type of crops grown, and use of pest-resistant crop varieties.

What About 1983?

"The basic acreage reduction programs for feed grains, wheat, rice, and cotton would probably result in a 3 to 5 percent reduction in pesticide use this year," says economist Ted Eichers. "Prices would likely rise by an offsetting amount—3 to 5 percent above 1982 levels.

"However, additional acreage reductions from the payment-in-kind (PIK) program may result in an added 5 to 7 percent drop in pesticide use. In that case, I'd expect prices to remain about the same as they were last year."

Here's a look at pesticide use and costs for the major field crops:

Corn

Corn farmers spent an average of $15.50 per acre on pesticides in 1981, with herbicides accounting for 60 percent of this cost. Herbicides were used largely to control cocklebur, foxtail, quackgrass, and velvetleaf.

While 1982 survey data are not yet available, demand for corn herbicides reportedly held up well. Virtually all U.S. corn acreage is treated with herbicides, so future market opportunities will most likely stem from demand for more effective products, such as postemergent herbicides.

Farmers apply most corn insecticides at or prior to planting to control rootworm larvae and other soil insect pests such as cutworms and wireworms. In 1980, 70 percent of all corn insecticide applications were made to control soil insects. Corn insecticide sales decreased substantially in 1981 and 1982 as some farmers decided to forgo early season soil insecticide applications to reduce expenses.

Corn insecticide use patterns may soon change as farmers adjust to new pro-

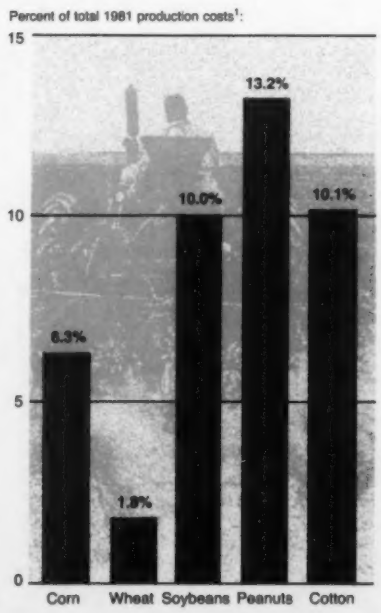
duction practices. Pest management programs, which include insect scouting, will encourage farmers to make more timely insecticide applications. Minimum-till strategies might increase the need for insecticides that control insects living in plant residue.

Wheat

Although wheat farmers spent an average of $2.25 per acre for pesticides in 1981, costs were considerably different for winter wheat, $1.25 per acre, and spring wheat, $3.75 per acre. Spring wheat requires more extensive herbicide use because weed infestations are more common during the spring vegetative growth stage.

As with corn, herbicides account for most of the pesticide applications. Farmers treated about 40 percent of the total U.S. wheat acreage with herbicides in 1976.

Pesticides' Share of Production Costs Varies by Crop



[1]Exclusive of land.

The availability of wheat varieties resistant to insects and disease has limited the need for wheat insecticides and fungicides. Plant geneticists have developed varieties that are resistant to such pests as the Hessian fly, stem sawfly, and rust diseases.

Soybeans

On the average, soybean farmers spent $14.75 per acre on pesticides in 1981, with herbicides accounting for the lion's share. In 1980, farmers treated 92 percent of the soybean acreage with herbicides and 11 percent with insecticides. Major weed problems were cocklebur, crabgrass, foxtail, Johnsongrass, and velvetleaf. The primary insect pests were armyworm, cabbage looper, corn earworm, and velvetleaf caterpillar.

Southern farmers face more severe weed and insect problems because of a longer growing season, more rainfall, nd a greater variety of pests. Soyeans grown in the South are vulnerale to weed infestations, especially hen double-cropped with grain and anted in late June or July.

s a result, southeastern and Delta soyean farmers spent an average of 18.25 per acre in 1981, primarily for erbicides, compared with $7 per acre / northern Plains soybean farmers.

early half the soybean acres in the outheast and a fifth of those in the elta were treated with insecticides in 980. Insects are generally not a prob-m in the Midwest.

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eanuts

eanut growers spent an average of 79 per acre on pesticides in 1981. osts ranged from $36.50 per acre in the southern Plains to $95 per acre in the Southeast.

More than 90 percent of the planted acres were treated with herbicides in 1976, 55 percent with insecticides, and 76 percent with fungicides. Many farmers also control insect and disease pests by cultivating their fields. This practice covers debris that harbors pests. Nematodes can be controlled by rotating peanuts with corn or pasture.

Cotton

Cotton farmers applied, on average, $42.50 worth of pesticides per acre in 1981, but costs ranged from $12.75 per acre in the southern Plains to more than $100 per acre in the Southeast.

Farmers treated 91 percent of the planted acreage with herbicides in 1979, about 40 percent with insecticides, and 10 percent with fungicides. Except in the southern Plains, most cotton acreage is treated with a defoliant or desiccant which causes leaves to fall off or dry up, making mechanical harvesting easier.

In dryland cotton areas of the southern Plains, insect and weed infestations are generally not a problem because of limited moisture. Also, short-season cotton varieties are grown there and harvested before insects usually become a problem.

Farmers scout about 90 percent of the U.S. cotton acreage for insect pests. This permits more timely insecticide applications, which allow beneficial insects to help control harmful insects. Also, postseason insecticide applications and stalk destruction can reduce insect infestations—such as overwintering boll weevil populations. The long-term effect of cotton IPM programs may reduce the number of insecticide applications made to cotton. □

[This article was written by ERS economists Bill Serletis of the National Economics Division and Michael Hanthorn of the Natural Resource Economics Division, with contributions from Ted Eichers and Herman Delvo.]

Catch-Up Campaign for China's Agriculture

China's emergence as a major agricultural market overshadowed its role as one of the world's largest producers, and for good reason. Imports were rising, and most of its farm production—particularly the grains and livestock—never left China.

Now, however, China's farm imports are dragging, and exporting nations like the United States are taking a closer look at China's agricultural potential.

China leads the world in rice production and just moved into the number one spot in cotton, outstripping the usual leaders, the USSR and the United States. China also ranks among the top producers of coarse grains, wheat, oilseeds, sugar, and pork. The latest rice crop of around 148 million tons accounts for well over a third of global rice output.

Nevertheless, with a population of 1 billion and counting—more than a fifth of the world's people—almost all of China's output is consumed internally. Imports are currently needed to provide an estimated 4 to 6 percent of total grain consumption, not as large a share as in the case of Japan or even the USSR but still significant.

Over the last few years, China's farm sector has made considerable progress. Combined production of rice, coarse grains, and wheat has risen 23 percent since 1977. Meat production—95 percent of which is pork—has doubled over the last decade, reaching more than 12 million tons. These gains are impressive, but they may not be sustainable.

"Although the growth of the agricultural sector over the past 5 years is striking, it must be measured against the backdrop of 20 years of very slow improvement," explains Frederic Surls, an agricultural economist with USDA's Economic Research Service. "Growth in crop production has averaged only a little more than one-half of 1 percent a year since the mid-1950's, with most of the gain coming in recent years. Future increases may come more dearly."

A Time for Catching Up

According to Surls, the recent spurt reflects China's catch-up campaign after the Cultural Revolution of the late 1960's and early 1970's. During that period, land, labor, and farm inputs were wasted, and agricultural education and technology were ignored in order to strive for what was then considered pure Marxism.

"The policy at the time was for all areas to aim for self-sufficiency in grain production. The areas in the North China Plain that were more suitable for cotton started emphasizing grain production because the government stopped supplying them with grain. They still planted and harvested cotton, but they didn't allocate the manpower, fertilizer, or management to it, so yields fell dramatically," Surls says.

To make up the losses, the current leadership has stressed more efficient use of land, with each area again specializing in the crops it grows best.

"The government has stepped in to guarantee grain supplies to make this specialization possible," Surls says. "This is where the United States comes in. Our exports to China, together with sales by other countries, have provided grain for China's cities and have allowed the government to divert domestic grain to rural areas involved in the specialization program."

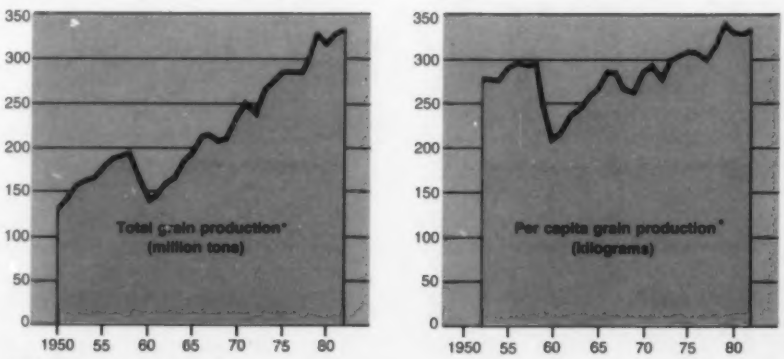
In addition, fertilizer and farm machinery are now more readily available and more economically used.

"Fertilizer is a good example of the catching up China had to do in the early years after the Cultural Revolution," Surls says. "Western technology was shunned during the 1960's, but in 1973 and 1974 China literally went out and bought a fertilizer industry based on U.S. technology. It purchased 13 large-scale ammonia-urea plants, and fertilizer production soared 70 percent from 1977 to 1981. This has made a major contribution to the recent surge in crop production."

Incentive-laden policies that direct large government payments into the farm sector have also improved Chinese agriculture. Higher procurement prices and increased supplies of farm inputs helped push production of cash crops—cotton, oilseeds, sugar—to record levels in the last 2 years.

This year, China's cotton output pro-

Catch-Up Campaign Yields Impressive Increases in Grain Production, But Past Setbacks and Population Growth Limit Per Capita Gains



1982 estimated

*Includes rice, wheat, coarse grains, pulses, tubers, and soybeans.

bably rose about 9 percent from a year earlier, while oilseeds climbed 7 percent, and sugar crops 8 percent.

Grain production, however, is suffering. Because more area has now been shifted back to other crops, grain output probably increased only about 4 percent this season. This rate of increase is good compared with previous years, but it's small in comparison with gains in other crops.

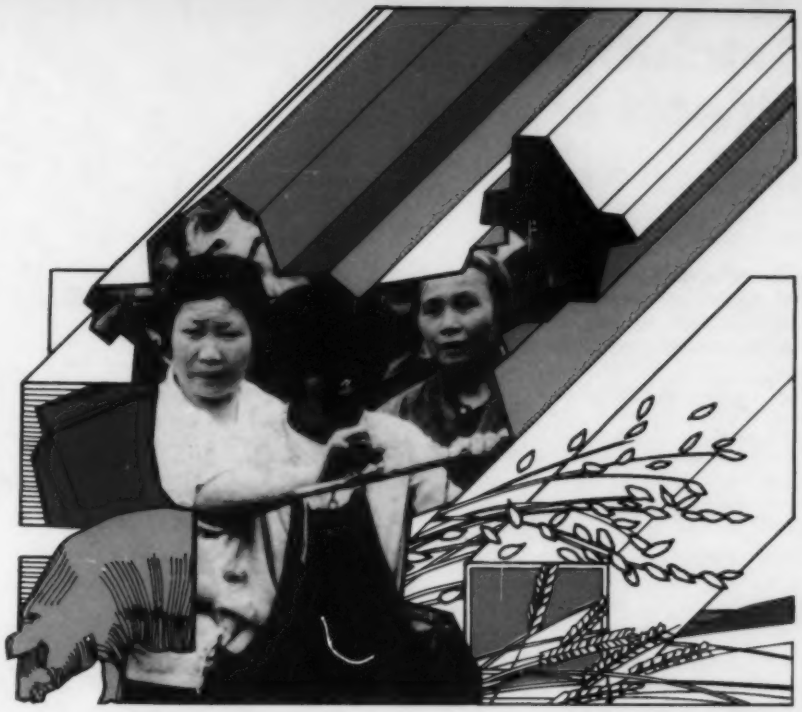
Over the past few years, China has followed a policy of import substitution—importing large amounts of lower priced grain while shifting land into cash crops, such as cotton, sugar, and soybeans. This shift allows China to import less of these products.

The import substitution policy worked too well, and about 6 million hectares were taken out of grain production during 1977–82. Roughly three-fourths of this area went to cash crops. Now China's officials are trying to encourage some farmers to shift land back into grain while still maintaining their program of regional specialization.

To raise overall agricultural output, China's leaders are also trying other methods that are major departures from the Cultural Revolution. According to Surls, some of these are oriented toward a less centrally controlled market.

For example, the government has expanded the legal size of farmers' private plots. Production from these plots can be sold in free markets, and farmers keep the profits. Private plots account for over 90 percent of China's hog output, as well as a sizable share of the vegetables, poultry, and fruit.

"Though no official figures are available, you can safely assume that the percentage of the average farmer's income derived from private sources in 1982 was much higher than the 25 percent reported for 1979," says Fred Crook, a colleague of Surls. "With these private plots and 43,000 flourishing free markets, rural incomes have risen rapidly." *(Continued)*



Linking Income to Productivity

One of China's tools for raising production and income is the "production responsibility system."

This is a system of contracting specific jobs or production quotas to households within communes—China's basic administrative unit for organizing the countryside. Basically, production teams within communes assign the responsibility of producing a certain amount of agricultural goods or light industrial items to each farm household.

Depending on the leadership in each commune, the arrangements vary from short-term labor contracts to well developed landlord-tenant relationships. The tenant-like system is probably the most controversial because it shows the greatest departure from collective production and the past policy of paying all workers regardless of the amount and quality of work.

Under the tenant system, the teams assign each household the use of a piece of land and give them the use of other necessary materials. At the end of the year, whatever production remains after a certain quota has been filled is the household's payment for its labor. The household can consume the remaining output or sell it in the free market.

"The production responsibility system is part of a set of new agricultural policies that attempt to link farmers' incomes directly to effort and productivity," says economist Frederic Surls. "To put it in their terms, they're trying to 'break the iron rice bowl,' that is to move somewhat away from egalitarian income distribution. Income is now tied more closely to work."

Fred Crook sees some drawbacks to the production responsibility system.

"Rural recordkeeping is poor, and many farm managers are not well trained to handle the massive burden of making proper contracts," Crook says. "In addition, contracts have broken down in the past because managers and farmers couldn't agree on how to equitably resolve breaches of contract because of crop failure and weather."

Imports Down

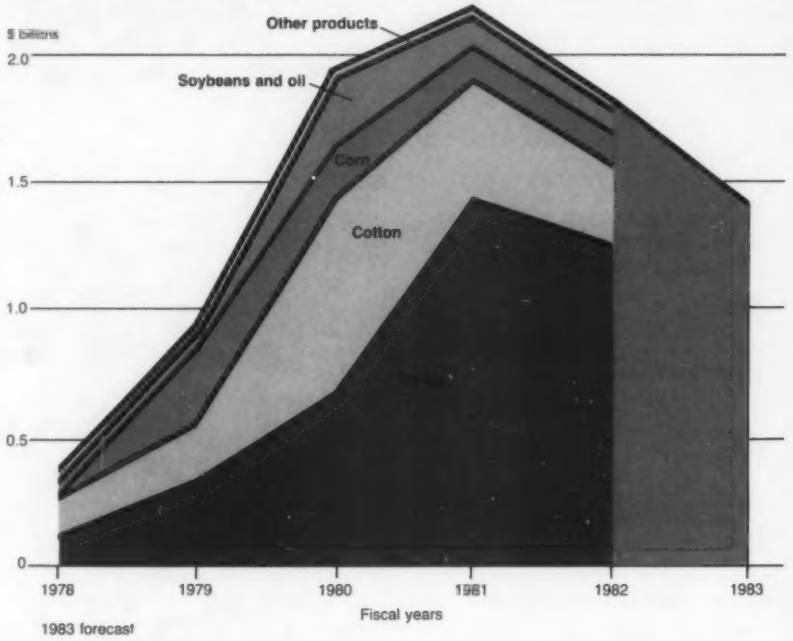
Of course, the excellent crops of the last couple of years have led to lower imports, including those from the United States.

U.S. agricultural exports to China increased from $66 million in 1977 to $2.2 billion in 1981. However, for the 1982 fiscal year, which ended last September, exports slipped to $1.8 billion. Because of lower prices for U.S. products and further cuts in Chinese purchases, U.S. exports may decline again this year—down to a projected $1.4 billion.

Increased production isn't the only factor limiting farm imports. China's leaders have been unwilling to accumulate a large foreign debt, and they're being careful in their use of credit and foreign exchange.

Among individual crops, U.S. cotton exports were the hardest hit in 1982. Because of China's large crop and weak world demand for textiles, U.S. cotton exports slipped to $292 million, down from $481 million in 1981 and a record $755 million in 1980. Over the 2-year period, the volume dropped from 510,000 tons to 190,000.

Sales Figures Show the Current Slump in U.S. Agricultural Exports to China



China Retaliates on Quota Decision

In retaliation for a U.S. decision to set new limits on imports of Chinese textiles, the Chinese government recently said it will suspend purchases of U.S. cotton, soybeans, and synthetic fibers. The January 19 announcement came just a few days after the United States expanded the categories covered by its quotas on Chinese textiles.

China's action should not have a major impact on 1983 trade projections. So far, it is limited to products in relatively good supply in China this year, and analysts had not expected significant Chinese purchases. China hasn't bought any U.S. cotton or soybeans since last summer.

Nevertheless, the suspension seemed to signal China's determination not to allow further deterioration in its trade balance with the United States. Thus, the key question is whether the suspension could be extended to U.S. grain or other farm and industrial goods if trade differences over textiles aren't resolved.

Bloom May Fade

Despite China's success in boosting output and reducing imports, the pace may not continue indefinitely. "We don't expect U.S. agricultural exports to return to 1981's record levels for the next several years, barring a serious crop failure in China. Beyond that, however, the picture is less certain," Surls says.

"Growth in the farm sector over the last few years can be attributed to China making up for past waste and mismanagement. So, the easiest gains have probably already been made. Also, growth in fertilizer production, an important contributor to past agricultural success, is slacking off."

Furthermore, over the last few years, the government's attempts to expand farm income and still keep retail prices low have led China into budgetary problems. Because of this, the large infusions of money and other inputs into the farm sector are probably over. In coming years, China will be relying more on improving its technology and restructuring its farm systems and farm policies to keep output growing. □

[*Based on material provided by economists Frederic Surls and Fred Crook, China specialists of the International Economics Division, Economic Research Service.*]

AGRICULTURAL ROUNDUP

Instant Access Through AGNET

The Economic Research Service has added a new delivery system to its public information arsenal: AGNET, a computer network that offers instant access to the latest agricultural news from the agency.

Summaries of ERS Outlook and Situation reports are now available through AGNET on the same day that the material is officially approved by USDA's World Agricultural Outlook Board in Washington, D.C. The full text of each report, including all tabular data, is usually on the system the next working day. (A January-June schedule of ERS Outlook and Situation reports, with summary release dates, can be found on pages 10–11).

Those who subscribe to the published versions of reports often wait about 3 weeks from the release dates for printing and mailing. ERS has moved into electronic dissemination of information to provide faster service to data users who need a large-scale and up-to-the-minute information base to keep up with changing conditions in agriculture.

Outlook and Situation reports provide timely analysis and forecasts on major farm commodities and other agricultural topics such as exports, finance, fertilizer, land values, and world trade and production.

AGNET is based at the University of Nebraska at Lincoln and is the joint effort of state universities in Montana, North and South Dakota, Washington, and Wyoming. Anyone may subscribe to the service. Currently, more than 3,000 individuals and organizations in 48 states have working agreements to access information from AGNET.

Nearly half of AGNET users are university faculty and researchers; more than a fifth are farmers, ranchers, and farm management firms; and the rest are export firms and other businesses, government agencies, and bankers and other lenders.

AGNET is a "user friendly" system. A client dials up the computer on a conventional telephone line, types a special identification term and a password on the home or office terminal, and then enters the one-word name of the computer program—in this case, ERS.

At that point, the AGNET procedure leads the user step by step through the program. For example, in the case of the ERS Outlook and Situation reports, the subscriber sees a list of all the report titles in the system, selects the title desired, and is then shown a table of contents indicating each different section in the report and every data table.

The procedure allows the subscriber to easily and quickly locate information so that computer time can be held to a minimum. That's important because costs while linked to the computer are around $20 to $30 an hour during Central Time business hours. Charges are less during evenings and weekends.

Any terminal that can operate over telephone lines and types 30 or 120 characters per second can be used on AGNET.

ERS intends to expand its use of AGNET by adding abstracts of recent research reports as well as the supply and demand estimates issued by the World Agricultural Outlook Board.

For further information or a trial account, contact: AGNET, 105 Miller Hall, University of Nebraska, Lincoln, NE 68583 (phone 402–472–1892).

Profile of Rural Poverty

Until recently, poverty seemed to be shrinking nationwide, but the countryside has always had a disproportionate share of the nation's poor.

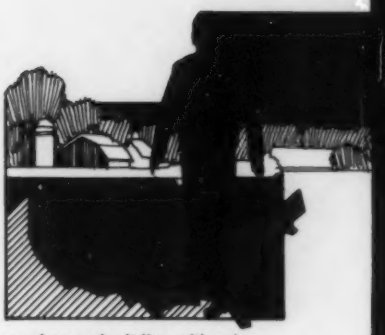
Nonmetro areas contained less than a third of the U.S. population in 1981, but they had 39 percent of the poor, according to economist Virginia Getz of USDA's Economic Research Service. At that time, the official poverty threshold was set at $8,450 in annual income for a family of four.

The number of poor Americans dropped from nearly 40 million in 1959 to 24 million in 1969, and then fluctuated between 23 million and 26 million during the 1970's. However, because of inflation and the economic downturn, the number increased from 26 million in 1979 to 32 million in 1981.

Compared with their urban counterparts, the rural poor, numbering 12.5 million in 1981, are more likely to be white, live in male-headed households, be over 65 years old, and live in the South.

Poverty is more widespread among the 8 percent of the rural population that is black than among rural whites. Nevertheless, almost 75 percent of the rural poor are white, compared with 62 percent of the urban poor. Furthermore, nearly 20 percent of the rural poor are over 65 years old, compared with about 12 percent of the urban poor.

Slightly more than one-half of the rural poor live in male-headed households, in contrast to one-third of the urban poor. However, the proportion of female-headed families among the rural poor is growing, from 22 percent in 1971 to almost 27 percent in 1979. The rest of the



rural poor don't live with relatives, so they aren't listed in head-of-household data.

The rural South has traditionally been one of the poorest areas. A recent USDA study found that over 90 percent of the U.S. counties with consistently low per capita incomes over the last 30 years are in the South.

"Moreover, rural people are heavily concentrated in the South. These factors make nonmetro poverty largely a southern phenomenon," Getz says.

The poor living on farms are no longer a large component of the total poverty population. In 1959, there were 8 million farm poor, about 20 percent of the total poor. By 1980, there were only 1 million farm poor—3 percent of the total poor. The overall decline in the farm population, combined with increased off-farm income, contributed to the drop.

"Statistics don't support the belief that poverty is largely a result of unwillingness to work. Thirty-eight percent of poor rural families have one worker, and 25 percent have two or more. For those not working, the main reasons are illness or disability, keeping house and taking care of children or other dependents, and retirement," Getz says.

"Therefore, increasing the number of rural poor who work would require serious efforts to employ the handicapped, provide rural day-care facilities for the children of single parents, and encourage the elderly to work."

All About the Peanut Industry

With a farm value of over $1 billion, peanuts are the nation's ninth most valuable cash crop and one of the most versatile. Peanuts are used for food, oil, and livestock feed products.

The United States has a 10-percent share of world output, making it the world's third largest peanut producer behind India and China. As the leading exporter, the United States supplies about 25 percent of the peanuts entering world trade.

Food, especially peanut butter, is the main domestic use for U.S. peanuts. Oil is the main product of peanuts raised elsewhere. Peanut butter, which is practically unavailable outside the United States, accounts for a quarter of domestic production.

U.S. peanuts are grown on about 1.5 million acres in rather small plots (50-acre average). While the total acreage planted has remained virtually constant since the early 1950's, production has more than doubled because yields nearly tripled.

The complexities of the peanut industry—growing, handling, and marketing—are examined in **U.S. Peanut Industry,** a recent Economic Research Service publication. The report covers peanut use, acreage, and production trends; world production and consumption; government programs; and the workings of the peanut industry.

Other highlights include:
- Production and yield by state since 1950.
- Major markets for peanut exports.
- Primary uses for different peanut varieties.
- Production costs and marketing practices.

Data tables provide supply, demand, and production cost information, and charts highlight major industry trends.

***U.S. Peanut Industry** by W.C. McArthur, Verner Grise, Harry Doty, and Duane Hacklander. (Published November 1982; 52 pages, text and tables; GPO Stock No. 001–000–04310–2; $4.75.)*

Consumption Trends: America's Menu

U.S. food consumption dropped 7 pounds per person in 1981 to 1,400 pounds retail weight. Americans consumed less meat, dairy products, and vegetables, but more fruit and sweeteners.

Since 1960, per capita consumption figures have ranged from a low of 1,368 pounds in 1974 to a high of 1,415 pounds in 1979.

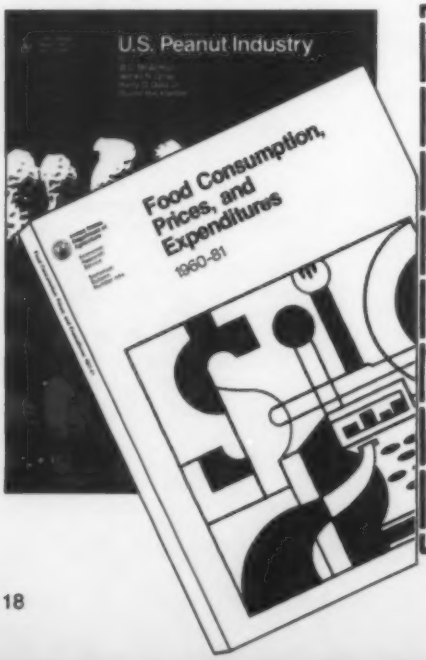
Total food spending by Americans rose nearly 10 percent to $329 billion in 1981. However, Americans spent only 16.2 percent of their disposable income on food, the lowest since 1974. At the same time, the farmer's share of the retail food dollar dropped to the lowest level in two decades—only 35 cents per dollar.

Food Consumption, Prices, and Expenditures, 1960–81 provides an up-to-date and unified source of food data. Ninety tables present USDA's 1981 estimates as well as historical data for:

- Food supply and utilization for 46 commodities.
- Per capita consumption for 23 product categories.
- Retail and producer price indexes.
- Farm-to-retail price spreads.
- Indexes of food industry marketing costs.
- Income and food expenditure statistics.

The highlights for 1981 are discussed in introductory notes, and eight charts depict significant changes in key food-sector indicators since the 1960's.

***Food Consumption, Prices, and Expenditures, 1960–81,** prepared by Richard Prescott and Anne Rogers. (Published November 1982; 104 pages, mostly tables; GPO Stock No. 001-019-00330-8; $5.50.)*



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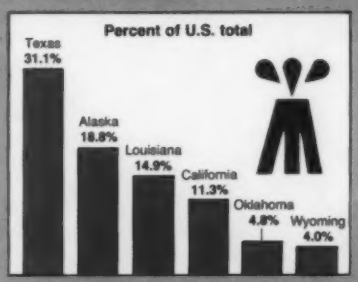
The Energy-Rich States

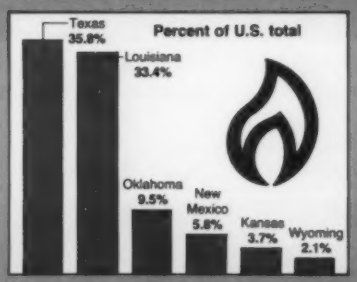
Just a few states produce the bulk of our domestic supplies of oil, natural gas, and coal. Many of the same states are well endowed with both oil and gas.

Top Six States in Crude Petroleum Production



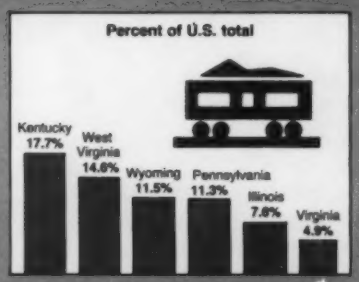
In oil production, the top six states accounted for 85% of domestic supplies in 1980; the rest came from the other 25 oil producing states. About 64% of total supplies came from domestic sources, up from 54% in 1977.

Top Six States in Natural Gas Production



Natural gas production is more concentrated. The top six states accounted for 90% of domestic supplies in 1980; 25 other states produced the remaining 10%. Roughly 95% of total U.S. consumption came from domestic sources.

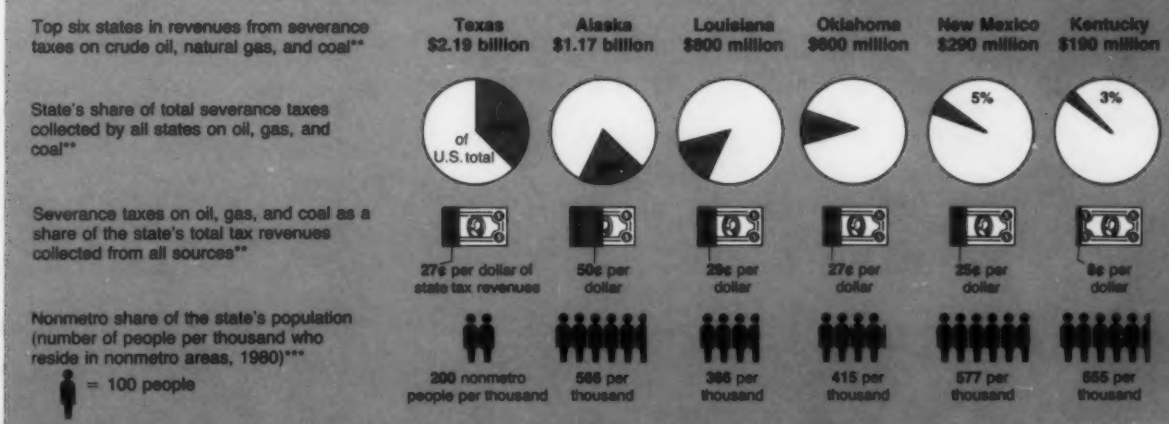
Top Six States in Coal Production



Coal production is less dependent on a few top states. The six major producers provided only about 67% of U.S. coal output, with 19 other states supplying the rest. In 1980, 11% of our production was exported.

Energy wealth has its benefits. State severance taxes* on oil, natural gas, and coal provided $5.9 billion in revenues in fiscal 1981, up from $2.5 billion in 1979. Six states took in almost 90% of the total. These revenues enable the states to depend less on income, sales, and other taxes on their residents. In Texas, energy severance taxes provided 27¢ of each tax dollar collected by the state; in Alaska, 50¢.

Energy development also provides jobs and income for state residents. At the same time, however, it can increase the demands on public services and the competition for land and water. Both the benefits and burdens often fall heavily on nonmetro areas. That's where much of the energy development occurs. Also, most energy-rich states have a large share of their populations living in nonmetro areas.


Top six states in revenues from severance taxes on crude oil, natural gas, and coal**
Texas $2.19 billion
Alaska $1.17 billion
Louisiana $800 million
Oklahoma $600 million
New Mexico $290 million
Kentucky $190 million
State's share of total severance taxes collected by all states on oil, gas, and coal**
of U.S. total
5%
3%
Severance taxes on oil, gas, and coal as a share of the state's total tax revenues collected from all sources**
27¢ per dollar of state tax revenues
50¢ per dollar
29¢ per dollar
27¢ per dollar
25¢ per dollar
8¢ per dollar
Nonmetro share of the state's population (number of people per thousand who reside in nonmetro areas, 1980)***
= 100 people
200 nonmetro people per thousand
586 per thousand
396 per thousand
415 per thousand
577 per thousand
565 per thousand

*A tax on the extraction of resources. **Figures for fiscal 1981. ***The U.S. average was 252 nonmetro people per thousand, as defined by the 1980 Census of Population.

Based on materials provided by USDA economist Ed Smith of the Economic Development Division, Economic Research Service.

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